

IN THE CLAIMS:

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22. (New) A method comprising:

providing a hydrophobic fluorine-functionalized aerogel on a solid support material;

contacting said hydrophobic fluorine -functionalized aerogel with an oil/ water mixture;

absorbing a plurality of the oil from the oil/ water mixture onto said hydrophobic fluorine-functionalized aerogel to form an oil-absorbed aerogel; and

separating said oil-absorbed aerogel from the remainder of the oil/ water mixture.

23. (New) The method recited in claim 22, wherein the plurality of oil absorbed is up to 3.5 times the weight of the hydrophobic fluorine-functionalized aerogel.

24. (New) The method recited in claim 22, wherein the support structure is selected from the group consisting of fiberglass, alumina, insulation, alumina tiles, long-chain polyester fibers made from ethylene glycol and terephthalic acid and cotton wool, and vitreous carbon foam.

25. (New) The method recited in claim 22, wherein the fluorine functionalization is CF₃.

26. (New) A method comprising:

providing a first solution containing a predetermined amount of an aqueous inorganic base, a predetermined amount of water, and a predetermined amount of an organic solvent;

providing a second solution containing a predetermined amount of tetramethylorthosilicate or tetraethylorthosilicate, a predetermined amount of a fluorine-functionalized organic silane, and a predetermined amount of said organic solvent;

adding said first solution to said second solution with stirring to form a pre-gel mixture;

allowing said pre-gel mixture to gel; and

drying said gel under supercritical extraction conditions to form a hydrophobic aerogel.

27. (New) The method recited in claim 26, wherein said fluorine-functionalized organic silane is (3, 3, 3-trifluoropropyl)-tetramethoxysilane.

28. (New) The method recited in claim 26, wherein said organic solvent is methanol.

29. (New) The method recited in claim 26, wherein said supercritical extraction conditions comprise a pressure of 2,000 psig and a temperature ranging from 295-300 °C for 4 hours followed by depressurization at 50 psig/ min.

30. (New) The method recited in claim 26, further comprising:
attaching said hydrophobic aerogel to a solid support material.

31. (New) The method recited in claim 30, wherein said solid support material is selected from the group consisting of fiberglass, alumina, insulation, alumina tiles, long-chain polyester fibers made from ethylene glycol and terephthalic acid and cotton wool, and vitreous carbon foam.

32. (New) A device comprising:
a hydrophobic CF₃-functionalized aerogel attached to a solid support material selected from the group consisting of fiberglass, alumina, insulation, alumina tiles, long-chain polyester fibers made from ethylene glycol and terephthalic acid and cotton wool, and vitreous carbon foam.